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Women in Indian dairy farming business: Significance, challenges, and way forward

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Abstract

In India, dairy farming plays a crucial role in supporting the livelihoods of millions, particularly rural women who constitute around 70% of the dairy labour force. This involvement not only enhances women's economic empowerment but also fosters social development and community advancement. Women actively participate in various dairy farming tasks, including animal care, milking, processing, and farm management. Despite facing challenges such as limited policy support and exposure to competitive market forces, women continue to contribute significantly to the dairy sector's growth and sustainability. Their involvement in dairy farming extends beyond economic contributions to include social empowerment and gender equality promotion. However, women's contributions often go unnoticed and are inadequately acknowledged, highlighting the need for greater recognition and support for their role in dairy farming. Efforts to empower women in dairy farming can lead to broader benefits such as enhanced nutrition, education, and employment opportunities, ultimately contributing to sustainable rural development and inclusive growth. Therefore, promoting women's participation in dairy farming is essential for achieving comprehensive economic and social progress in India.

Keywords: Dairy farming, women, challenges, solutions, way forward

Introduction

Agriculture, animal husbandry, and dairying have all played significant roles in human existence since the beginning of civilization (Balkrishna *et al.*, 2021) [3]. These actions have supported the food chain and drawn animal power, but they have also preserved ecological equilibrium. Due to the favourable climate and geography, the Animal Husbandry and Dairying sectors have had a significant socio-economic impact in India. Furthermore, the persistence of these acts might be attributed to traditional, cultural, and religious beliefs. Furthermore, they have a notable impact on creating profitable job opportunities in the rural sector, particularly for those who do not own land, small-scale farmers, and women. Additionally, they provide affordable and nourishing food to millions of individuals. The government has implemented several initiatives to enhance animal productivity, leading to a large rise in milk output. India has the title of being the foremost milk producer globally, accounting for 23% of the total milk output worldwide (MS Chauhan - Times of India, 2023) [22]. In the 1950s and 1960s, the circumstances underwent a significant transformation. India was a country with a shortage of milk, relying on imports, and experiencing negative yearly production growth for many years (Chand & Singh, 2023) [8]. The milk output saw an annual compound growth rate of 1.64% during the first decade following independence. However, this rate decreased to 1.15% in the 1960s. In 1950-51, the average amount of milk consumed per person in the nation was a mere 124 grammes per day. The milk output in the year 1950-51 was just 17 million Tonnes (MT). Before the implementation of Operation Flood in 1968-69, the amount of milk produced was only 21.2 million metric tonnes (MT). This figure rose to 30.4 MT by 1979-80 and further climbed to 51.4 MT by 1989-90. The milk production has risen to 209.96 million tonnes and 221.06 million tonnes for the years 2020-21 and 2021-22, respectively, indicating an annual growth rate of 5.29% (Milk Production in India, 2022) [38].

Currently, global milk production is increasing at a pace of two percent, but in India, the growth rate exceeds six percent. India has a greater per capita milk availability compared to the global average. Over three decades (namely the 1980s, the 1990s, and 2000s), the nation had a significant increase in daily milk consumption. Starting with a minimum of 107 grammes per person in 1970, the consumption grew to 427 grammes per person in the 2020-21 period. This amount surpasses the global average of 322 grammes per day in 2021. Following Operation Flood, the Indian dairy and animal husbandry industry became a major source of revenue for a significant number of rural families, mostly consisting of landless, tiny, or marginal farmers. Currently, India proudly maintained its position as the world's biggest milk-producing nation for over 25 years (Press Information Bureau, 2022) [38]. The role of women in dairy farming is crucial, as they make significant contributions to household income, nutritional security, and socio-economic empowerment. Around 70% of dairy farmers residing in rural areas are categorised as either landless or small/marginal farmers. In this context, women assume a prominent position in the management of cattle and the supervision of dairy operations. Women play a crucial role in the community, participating extensively and indispensably in a range of activities including harvesting and processing fodder, feeding animals, raising calves, and milking animals. Women's ownership and management of dairy animals not only leads to higher income, but also represents a sense of prestige, independence, and authority over household resources. This empowerment transcends economic domains, enhancing women's self-assurance, self-esteem, and ability to make independent decisions. Additionally, dairy farming provides women with a practical and sustainable job opportunity in their local communities, which can be pursued regardless of their literacy and skill levels. Dairy farming empowers women to make significant contributions to various positive outcomes, such as enhanced nutrition, education (particularly for girls), and the generation of employment opportunities, by increasing their incomes and ensuring economic stability. Women's inclusion in dairy development initiatives is crucial for promoting comprehensive growth and rural transformation. In light of this significance, multiple non-governmental organisations have been actively advocating for the involvement of women in dairy cooperatives, in accordance with government initiatives that seek to empower women in the field of agriculture. Women's involvement in dairy farming extends beyond their economic contributions, playing an instrumental role in fostering social empowerment, community development, and inclusive agricultural growth. India can achieve sustainable rural development and gender equality by fully utilising the capabilities of women in the dairy farming sector.

Women in Dairy Farming

Mahatma Gandhi once stated that villages are the backbone of the Indian economy. The sentiment is supported by research conducted in 2008 by Max New York Life Insurance and the National Council for Applied Economic Research (NCAER). This study found that an astonishing 70% of India's population, which is equivalent to 732 million people, live in rural areas. Nevertheless, in this rural setting, there are still significant discrepancies, especially when it comes to achieving gender equality and empowering women. India has made significant progress in improving literacy rates, achieving an overall rate of 74.00%. However, there are still gender disparities, with males having a considerably higher

literacy rate of 82.00% compared to females at 66.00% (Government of India | Office of the Registrar General & Census Commissioner, India, 2022) [18]. In addition, rural households headed by females make up only approximately 14.90% of the total, and female agricultural landholders account for a mere 10.90% (Jain *et al.*, 2023) [24]. These statistics highlight the difficulties that women encounter when trying to obtain resources, opportunities, and positions of authority in rural communities. Women residing in rural areas of India face a multitude of complex obstacles, such as elevated instances of selective abortion of female foetuses, reduced income, inadequate nutrition, restricted opportunities for education and skill development, and increased susceptibility to domestic abuse and sexual offences. Although they play a crucial role in both the family and the community, their contributions are frequently overlooked. Their responsibilities are often limited to traditional domestic tasks, lacking proper acknowledgement, respect, and accountability in terms of economic compensation. Within this particular framework, the promotion of women's empowerment takes on the utmost significance, not solely for the progression of gender parity but also for the promotion of sustainable development and comprehensive economic growth. Dairy farming is identified as a significant opportunity for empowering women, as agriculture, along with cattle rearing, is the main occupation in rural areas. Farmers have started engaging in dairy farming as a secondary occupation to make better use of available labour and increase their income. This decision has significant effects on the empowerment of women. Dairy plays a vital role in supporting the livelihoods of impoverished women in rural India, providing them with a practical means to achieve economic self-sufficiency and upward social mobility. Dairy cooperatives are crucial in promoting inclusivity and providing livelihood opportunities for small-scale farmers, especially women (Dohmworth & Liu, 2020) [16]. Women have traditionally played crucial roles in livestock rearing and dairy farming activities in India, making the dairy sector predominantly female-dominated (Bajpai & Kushwaha, 2020; Rajpurohit & Sareen, 2022) [2]. Women in dairy farming frequently go unnoticed and their contributions are not properly acknowledged or appreciated, despite their substantial impact (Padmaja *et al.*, 2020) [33]. In addition women tend to spend a significant amount of time participating in dairy farming activities, surpassing the efforts of men (Hansen *et al.*, 2020) [20]. This discrepancy emphasises the necessity of recognising and promoting the involvement of women in dairy farming, not just for their financial empowerment but also for the wider objective of gender parity and social fairness.

Dairy farming is an occupation that sustains the economic well-being of numerous women, particularly those living in rural areas and experiencing poverty, in India. Nearly 70 percent of dairy farmers are classified as landless or small/marginal farmers, with ownership of only one or two cattle. A significant proportion of families in India, known as landless, rely partially or entirely on livestock for their livelihood (Das *et al.*, 2020; Mukesh *et al.*, 2022) [13, 31]. Rural women play a significant role in the management and care of livestock. Their involvement in animal husbandry activities ranges from 80 to 90 percent (Awan *et al.*, 2021; Subathra *et al.*, 2020) [1, 48]. They actively engage in various tasks related to agriculture, such as harvesting and processing fodder, feeding animals, raising calves, bathing animals, cleaning sheds, transporting sick animals to hospitals, providing

treatment, and milking animals. A milch animal is a valuable economic asset for a family. Ownership of dairy animals not only leads to higher income, but also brings social status, a busy and engaged lifestyle, food and nutritional security, and the chance to have some autonomy over one's own life. Women exert a higher degree of authority over this particular resource, in contrast to other resources such as land within the village. Women's ownership of this asset enhances their confidence and self-esteem ultimately resulting in empowerment. It provides them with an opportunity to engage in a profession within the village, which yields greater economic and social benefits (Bharti, 2021, 2021; Senapati & Ojha, 2019) ^[6, 45]. This occupation can be effectively managed even with limited literacy abilities. Increasing incomes through a seemingly uncomplicated project focused on a single commodity can have various advantageous outcomes, such as improved nutrition, enhanced education (particularly for girls), increased employment opportunities, and the promotion of rural development (Bharti, 2021) ^[6]. A study conducted by the World Bank also highlighted the evident advantages that Operation Flood had on women and children. For those individuals who do not own land but have managed to acquire a milch animal, it has proven to be extremely beneficial (Khemka, 2022a, 2022b; Kurien, 2007) ^[26-27, 29]. Raising dairy animals provides a fresh opportunity for landless households who lack other means of achieving prosperity. For numerous families without land, who are predominantly unskilled and illiterate, it provides the sole option. The introduction of more productive breeds has also facilitated families in engaging in this business. Dairying is increasingly enhancing agricultural labour, particularly for women, who are predominantly engaged in rural areas. The drawbacks of working in agriculture motivate women to consider an alternative, and dairying offers a variety of opportunities (Rathod & Dixit, 2020; Sarkar & Dutta, 2020; van der Lee *et al.*, 2014) ^[40, 43, 50]. The significant contribution made by ordinary women has played a pivotal role in bringing about the white revolution. Raising cattle for milk is a significant livelihood for the landless rural poor throughout the nation. The small-scale dairy enterprise exhibits a wide range of characteristics. For instance, there are disparities between urban and rural areas. Urban areas often rely on private vendor marketing, while rural areas tend to have a greater emphasis on cooperatives. In rural areas, dairying is predominantly performed by women. In urban areas, the economic aspect of cattle rearing is more apparent, while in rural areas, the cultural and societal aspects of cattle keeping hold greater significance. Recognising the significance of incorporating women into dairy development, multiple non-governmental organisations have been taking steps to raise awareness about the potential role of women in dairy cooperatives at all levels (Basu, 2009; Chavan & Apte, n.d.; Kumari, 2013; Somani & Nahar, n.d.) ^[4].

Women Dairy Cooperatives

In rural India, where the majority of the population resides, agriculture remains the primary occupation, closely intertwined with the rearing of bovine species. Historical records trace back domestication practices over 8000 years, emphasising the cultural and economic significance of cattle as reflected in the scriptures (Bellwood, 2023; Chakraborty, 2023) ^[5]. Despite boasting the world's highest bovine population of approximately 303.76 million, India's milk production only meets a fraction of global demand, with regional surpluses failing to bridge the nationwide supply gap.

Notably, the success of initiatives like Operation Flood has propelled India to the forefront as the largest milk producer, annually yielding an impressive 74 million metric tonnes (Scholten, 2010) ^[44]. Currently, India has the position of being the foremost milk producer in the world, contributing to 23% of the worldwide production and 52% of Asia's overall output. The dairy sector in India is the biggest agricultural commodity, accounting for over 26% of the whole agriculture GDP and over 5% of the total GDP (Shankar *et al.*, 2023) ^[46]. Milk and its derivatives hold a dominant position within the cattle industry, constituting 66% of the production value and contributing substantially to both overall and agricultural GDP (Deshmukh, 2014) ^[14]. The five states with the highest milk production percentages are Rajasthan (15.05%), Uttar Pradesh (14.93%), Madhya Pradesh (8.6%), Gujarat (7.56%), and Andhra Pradesh (6.97%). Collectively, they account for 53.11% of the nation's total milk output. India exported 67,572.99 metric tonnes of dairy products to the global market, valued at \$284.65 million, in the fiscal year 2022-23 (Dairy Industry In India - Growth, FDI, Companies, Exports, 2023) ^[12].

Dairy cooperatives are currently regarded as a crucial means of enhancing the marketing system for milk in rural areas and empowering rural women. They provide effective marketing services to milk producers, enabling them to receive fair prices for their milk. Indian planners have been strategically focusing on women involved in dairy cooperatives as a means to facilitate socio-economic development. Women play a crucial role in the dairy industry, contributing more than males. Approximately 85 percent of those active in dairying are women. Women also have strong emotional connections with animals, seeing them as integral members of their family. Women possess a greater understanding of the behaviour, traits, and health aspects of these animals. Recognising the potential of women to contribute significantly to the sustainability of dairy development, efforts were initiated in the 1980s to engage them in dairy cooperative societies. This approach aimed to enable women to transition from being non-earners to being earning members, so improving their social and economic position. Multiple studies have consistently confirmed the crucial involvement of women in dairy-related tasks, including gathering fodder, watering, feeding, grazing, cleaning, collecting dung, milking, washing, and maintaining cow sheds. An approach centred around women was promoted as part of the strategy, which involved establishing an ample number of women dairy cooperative societies (WDCS) at the village level. The aim was to create WDCs as a means of generating additional income and providing an organised platform for addressing personal, social, and other concerns. WDC was regarded as the central hub for several initiatives related to women's development. The three-tier structure, consisting of societies, unions, and federations, was designed to serve as a potent means of not only implementing various poverty alleviation and awareness generating activities but also effectively communicating relevant messages to its members. The primary focus of the WDC initiatives has been to use the WDC as a central hub for programming and activities related to women's development. Essentially, the goals of WDC were to ensure that rural women not only experience economic benefits from the project, but also gain knowledge and skills in forming and managing village level cooperatives, as well as receiving training in the scientific management of milch animals. This would enable them to learn through drawing conclusions and contribute to their own

capacity building. Women's access to training in contemporary dairying and cooperative management is crucial for their empowerment and economic well-being. The inclusion of women in the workforce serves as an indicator of their economic and social standing within society.

Men overwhelmingly dominate the membership of the majority of India's 70,000 village-level Dairy Cooperative Societies (DCS). Nevertheless, the image is now undergoing a steady shift in favour of women. The Women's Dairy Cooperative Leadership Programme (WDCLP) was initiated in 1995 as a pilot initiative aimed at enhancing the dairy cooperative movement by substantially augmenting the involvement of women as engaged members and leaders in the administration of cooperative societies, unions, and federations. The Ministry of Human Resource Development (HRD), Government of India, offers financial support to cooperative milk producers' unions in certain states via the implementation of the "Support to Training and Employment Programme" (STEP) Programme. Within this programme, dairy cooperatives are established, where both the membership and administration consist solely of female milk producers. The WDC initiative, which stands for Women Development Corporation, was initiated in Haryana in 1998. The overall framework of WDC is seen as having the potential to provide social and economic benefits. Exploited segments of society are anticipated to experience significant social benefits. The establishment of the WDC (Women's Development Committee) in Haryana has effectively employed women in the field of dairy production, enabling them to transition from being non-earners to being active contributors to their household income.

Women's involvement in various activities on dairy farm

Dairying has strong historical ties to Indian family customs, with women serving as the fundamental support system for the nation's dairy industry, accounting for around 70 percent of the labour force. It has become a powerful tool for promoting social and economic empowerment among women, encouraging the development of leadership skills. Women not only provide assistance to one another, but also elevate whole communities (Pattnaik & Lahiri-Dutt, 2022) [37]. It is crucial to acknowledge and use the whole range of skills and abilities. Work settings that accommodate the specific requirements of women always provide advantages for all parties concerned. Farm women primarily engaged in dairy management tasks, which include the following:

1. **Dairy activities:** Women actively engaged in diverse dairy farm tasks, including independent responsibilities such as animal feeding, livestock care, cattle shed and waste management, keeping produce for consumption by the family, as well as the processing of produce (Ravichandran *et al.*, 2021) [42]. The participation of women from affluent farmer households in the milking and processing of milk products was highest. In contrast, women from landless farmer households were equally involved in all aspects of farming, while women from small and marginal farmer households were responsible for almost all tasks related to animal husbandry and dairy farming (Pattnaik & Lahiri-Dutt, 2020) [36].
2. **Management activities:** In India, women working on dairy farms are actively engaged in various tasks such as caring for young calves, milking, cleaning animal shelters and utensils, managing and weaning calves, preparing cow dung cakes, and constructing animal sheds. However, their involvement in maintaining farm records

is minimal. Studies reported 100% participation of female farmers in caring for new born calves, cleaning utensils and sheds, and producing compost, (Gupta *et al.*, 2020) [19]. Most women also participate in milking animals and weaning and maintaining calves (Naz *et al.*, 2022) [32]. The majority of women engage in milking (90%), cleaning animal shelters (89%), and managing cow manure or making cow dung cakes (87%) (Kathiriya *et al.*, 2013) [25]. However, their involvement in managing farm documentation and upkeep of animal shelters is limited (Chayal & Dhaka, 2016) [9]. Approximately 75.83% of female farmers participate in building animal shelters (Rathod *et al.*, 2011) [41].

3. **Feeding and watering for animals:** Women in rural farming communities play a crucial role in providing food and water for animals, shouldering exclusive responsibility for tasks such as gathering fodder, storing concentrates, and feeding young calves (Chayal *et al.*, 2013). Research indicates a high level of engagement among farm women in feeding, watering, and gathering fodder, with 87% participating in feeding and 85% in watering (Chayal & Dhaka, 2016; Kathiriya *et al.*, 2013) [10, 25]. Additionally, 82.5% of women are involved in bringing animals out for grazing, while 80.83% participate in gathering fodder, and 75% in grinding grain for animals. Women also handle storage tasks, such as hay making, accounting for 76% of their duties (Lahoti *et al.*, 2012) [30]. Making feed combinations, which involves combining concentrates with roughages or fodder, engages 68% of farm women (Rathod *et al.*, 2011) [41]. These findings underscore the significant contribution of women to the care and management of farm animals, highlighting their indispensable role in rural agriculture.
4. **Breeding activities:** Rural women play active roles in various breeding-related tasks such as pregnancy diagnosis and caregiving throughout pregnancy, with approximately 80% participating. However, their involvement in facilitating natural mating or artificial insemination is limited, primarily due to physical constraints and societal norms (Lahoti *et al.*, 2012) [30]. While around 90% of women are engaged in dairy cow breeding, their participation in activities like artificial insemination and selecting sires is restricted (Ingabire *et al.*, 2018) [23]. Despite their significant participation in breeding techniques, the primary responsibility for animal breeding generally lies with males.
5. **Miscellaneous activities:** The majority of rural women lack awareness and involvement in activities such as record maintenance and procuring loans for dairy farming (Patil & Babus, 2018; Rathod *et al.*, 2011) [35, 41]. Despite their significant role in dairy farming, they are minimally engaged in economic activities like loan procurement and milk processing, mainly due to lack of information and exposure. Efforts should be made to support and raise awareness among these women to enhance their participation in economic activities associated with dairy farming (Ullah *et al.*, 2021) [49].

Challenges faced by women in dairying

Over 20.5 million individuals rely on animal husbandry as their primary source of income. Small farm families derived 16% of their income from livestock, compared to an average of 14% for all rural households. Over 70 million rural families in India rely on livestock as a significant source of additional income (Patel *et al.*, 2021) [34]. Two-thirds of the rural

communities rely on livestock for their livelihood. Additionally, it offers employment to around 8.9% of India's population. India has abundant cattle resources. The livestock sector accounts for 4% of the Gross Domestic Product (GDP) and 26% of the overall GDP of the agriculture sector (Gamit *et al.*, 2021) ^[17]. According to the 20th Livestock Census, the animal population in India is 536 million, representing a 5% rise compared to the 19th Livestock Census. The bovine population reached a total of 302.79 million in 2019, with a growth rate of 1.0%. The country's cattle population is at 192.49 million, with 50.42 million being exotic/crossbred cattle and 142.11 million being indigenous/non-descript cattle. The national buffalo population reached 109.85 million, indicating a growth of around 1.0% compared to the previous census. The country's milk production reached a total of 187.75 million tonnes, reflecting a 7% rise compared to the previous year. The milk availability per capita is 394 grammes per day. India's milk output has consistently risen since 1950-51, starting with a total production of 17 million tonnes. Here present review attempts to highlight various challenges (Table 1) faced by the women dairy farmers in different regions of the country based on published reports.

1. **Limited policy support:** The absence of significant policy interventions, such as price assistance, milk quotas, and export subsidies, which give the dairy industry in developed nations a competitive edge, puts rural women dairy farmers at a disadvantage compared to their counterparts in OECD countries.
2. **Exposure to competitive business forces:** Rural women engaged in dairy farming are exposed to competitive business pressures via trade liberalisation. This exposes them to competition from large-scale corporate dairy operations, which possess the ability to quickly adapt to market changes and have better flexibility. Consequently, small-scale producers face a significant challenge.
3. **Insufficient investment in dairy chain infrastructure:** The insufficient allocation of resources towards the infrastructure of the dairy system is impeding the establishment of sustainable 'milk sheds' and potentially placing rural women at a disadvantage, as they depend on efficient supply chains for their dairy businesses.
4. **Inadequate dairy development schemes:** Numerous public dairy development plans exhibit a lack of organisation and a strategic approach, often conforming to popular patterns rather than effectively addressing the distinct requirements of rural women engaged in dairy farming. This failure diminishes the accessibility of resources for dairy development initiatives.
5. **Ecological issues:** Environmental issues arise from low-yield dairy systems in some places, since they result in greater carbon footprints per unit of milk produced, thereby creating questions about environmental sustainability. Regulations about greenhouse gas emissions may provide additional difficulties for the sustainability of small-scale dairy production, particularly for women in rural areas.
6. **Rising consumer demand for enhanced food safety:** Increasing consumer demand for food safety: Rural women engaged in dairy farming may have challenges in meeting food safety regulations owing to limited milk production and the high expenses associated with investing in dairy equipment. Nevertheless, endeavours such as the village milk-quality project in Karnataka, India, provide promising resolutions for generating milk of superior quality while effectively managing production expenses.
7. **Problems with dairy succession:** Succession issues in dairy farming arise when highly educated farmers from prosperous dairy businesses choose to pursue other career options outside the industry. This may result in a depletion of essential capital and skills required for the continued growth of dairy farming, particularly among rural women.
8. **Increasing regional wage levels:** Rising local pay rates may hinder rural women in dairy farming, especially if dairy labour efficiency does not keep up with the increasing wage levels. This can make small-scale dairy farming less competitive in the labour market.
9. **Family ties:** Women residing in rural regions often shoulder the primary burden of home obligations, encompassing caregiving and domestic tasks, which might restrict their availability and vitality for entrepreneurial endeavours such as overseeing a dairy enterprise.
10. **Male-dominated society:** Despite women's active participation in day-to-day operations, patriarchal traditions that are common in rural areas sometimes marginalise their voices and restrict their ability to make decisions within the dairy industry.
11. **Education and Social Barriers:** Limited access to quality education in rural areas hampers women's acquisition of essential skills in livestock management, business administration, and financial literacy. Deep-rooted social norms and stereotypes discourage women from assuming leadership roles in the dairy sector, perpetuating gender inequalities and limiting access to resources.
12. **Raw Material Shortage:** Women in dairy farming struggle to access quality feed, fodder, and veterinary services, crucial for maintaining livestock health and productivity.
13. **Financial Constraints:** Limited access to credit and financial services presents a significant barrier for rural women entrepreneurs, hindering investments in infrastructure, technology, and livestock expansion.
14. **Competitive Challenges:** Women-led dairy businesses face stiff competition from larger, established farms, making it difficult to penetrate markets or command higher prices for their products.
15. **High Production Costs and Risk Aversion:** Rising input costs, coupled with limited risk-bearing capacity, erode profitability for women-owned dairy enterprises, impacting scalability and innovation.

To summarise, the majority of the challenges that were discussed above are the reason why women who work in small-scale dairy farming are not attaining their full potential.

Solutions for Indian women entrepreneurs' issues

Strategies to address the challenges encountered by female entrepreneurs in India (Table 1). The prevalence of female entrepreneurship has been consistently increasing in recent years; yet, this upward trend is accompanied by a distinct set of obstacles and difficulties. Female entrepreneurs encounter several obstacles during their professional journeys and have provided the following recommendations:

1. **Finance cells:** A wide range of different finance cells may be available to provide women business owner's quick access to capital. These specialised cells aim to

provide financial assistance to female entrepreneurs at reduced and favourable interest rates, along with convenient payment methods. These financial cells should be staffed by female officers and clerks. It is important to make endeavours to ensure the provision of financial resources at the local level.

2. **Marketing cooperatives:** Marketing cooperatives should be developed to promote and support women entrepreneurs. The government should prioritise women entrepreneurs when procuring their needs. These marketing collaborations will assist female businesses in selling their items at profitable costs. This will aid in eliminating intermediaries.
3. **Availability of raw materials:** Women entrepreneurs should be given priority access to the necessary, limited, and imported raw materials at a reduced cost.
4. **Educational and awareness initiatives:** Educational and awareness initiatives should be organised to alter the

adverse societal perceptions about women. There is a need to alter the mindset of older individuals on the capabilities and rightful position of females in society.

5. **Training facilities:** Training facilities are crucial for fostering entrepreneurship, with training and development programmes playing a vital part in this process. Special training programmes should be devised in a manner that enables women to fully benefit from them. Training centres should provide mobile and part-time facilities to effectively attract a greater number of women.
6. **Training requirements:** Given the extensive participation of women in many activities, it is clear that their productive capabilities can only be fully used if women have the requisite training, technical expertise, and support. Agricultural women often handle the tasks of housing, feeding, and managing agricultural operations.

Table 1: A summary of challenges faced by women and their potential solutions

Existing Challenges	Potential Solutions
Limited policy support, Inadequate dairy development schemes, Exposure to competitive business forces	Finance cells, Advocate for equitable land rights, modernize development schemes, and foster collaborative marketing to empower women and raise regional competitiveness in dairy.
Insufficient investment in dairy chain infrastructure, Financial Constraints, Competitive Challenges	Branding and marketing, Technology adoption, Direct marketing, Collaboration and knowledge sharing.
Ecological issues, Rising consumer demand for enhanced food safety	Training facilities, Regenerative Agriculture, Precision livestock farming, decreasing carbon and water footprint, Transparency and Traceability, Certification Schemes, Consumer Education and Engagement, Policy and Incentive Programs, Collaborative Partnerships.
Problems with dairy succession	Land inheritance reform, financial assistance, Mentorship and training, Succession planning resources.
Increasing regional wage levels	Wage and benefit adjustments, Flexible work arrangements, Technology and automation, Direct marketing and value-added products, Collaboration, and advocacy.
Family ties, Male-dominated society, Education and Social Barriers	Educational and awareness initiatives, Addressing gender stereotypes.
Raw Material Shortage, High Production Costs and Risk Aversion	Diversify suppliers, invest in sustainable sourcing, Substitute materials, Inventory management, Near-shoring or reshoring, Contingency planning, Data-driven decision making, Renegotiate contracts.

Conclusion

Dairy farm women have a crucial role in both animal care and farm management, which is influenced by the specific circumstances, individual traits, and socio-economic status of their families. Training is a crucial component of empowerment that may augment knowledge, boost skills, and transform the mind set of rural women. Women dairy cooperative societies (WDCS) members directly sell their milk to village cooperatives, who then market it to the Milk Union. This bypasses the involvement of middlemen, resulting in benefits for the recipients. The money generated from milk serves as their only consistent source of cash flow, therefore making dairying a financially sustainable endeavour for them. The provision of essential financial aid by banks and state governments to women dairy cooperative organisations, enabling them to acquire elite animals and get marketing support, has greatly benefited the recipients. The provision of technical input services, such as animal insemination, balanced cow feed with bypass proteins, improved fodder types, and emergency veterinary health services, has not only contributed to the increase and maintenance of milk production, but has also resulted in an improved quality of life in the communities. Women possess extensive knowledge about several high-yielding types of fodder seeds and are reaping the benefits of current technological input services. The training of members in

many aspects of animal husbandry has significantly contributed to the enhancement of knowledge and the application of advanced technologies. The aim is to empower women to assume leadership roles and engage in all three levels of the Anand pattern organisation, which includes village-level societies, district-level unions, and state-level federations.

Cultivating an environment where women hold equal say in decision-making processes and receive due recognition for their contributions to the dairy industry is the primary objective in progressing forward as a society. Providing tailored training programs on animal care, breeding, disease management, financial literacy, and leadership skills to empower women dairy farmers are some of the essential ways to achieve it.

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